National Institute of Environmental Health Sciences

The feasibility of developing a risk assessment for the impact of climate change on the emergence of Crimean-Congo haemorrhagic fever in livestock in Europe: A review

Author(s): Gale P, Estrada-Pena A, Martinez M, Ulrich RG, Wilson A, Capelli G, Phipps P, de la Torre A, Munoz MJ, Dottori M, Mioulet V, Fooks AR

Year: 2010

Journal: Journal of Applied Microbiology. 108 (6): 1859-1870

Abstract:

Crimean-Congo haemorrhagic fever virus (CCHFV) is one of the most widespread of all medically important arboviruses with ticks of the Hyalomma spp. serving as the main vectors. Infection of livestock by CCHFV serves as a route of exposure to humans, as a reservoir of disease and as a route of importation. This study discusses the pathways and data requirements for a qualitative risk assessment for the emergence of CCHFV in livestock in Europe. A risk map approach is proposed based on layers that include the potential routes of release (e.g. by migrating birds carrying infected ticks) together with the main components for exposure, namely the distributions of the tick vectors, the small vertebrate host reservoirs and the livestock. A layer on landscape fragmentation serves as a surrogate for proximity of livestock to the tick cycle. Although the impact of climate change on the emergence of CCHF is not clear, comparing the distribution of risk factors in each layer currently with those predicted in the 2080s with climate change can be used to speculate how potential high-risk areas may shift. According to the risk pathway, transstadial and/or transovarial transmission in the tick vector are crucial for CCHFV spread. Vector competence and tick vector switching, however, remain critical factors for CCHFV colonization of new regions in Europe. The species of migratory bird is also an important consideration in the release assessment with greater abundance and biodiversity of ground-dwelling birds in southern Europe than in northern Europe.

Source: http://dx.doi.org/10.1111/j.1365-2672.2009.04638.x

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Food/Water Quality, Precipitation, Temperature

Food/Water Quality: Pathogen

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Tick-borne Disease

Tick-borne Disease: Crimean-Congo Haemorrhagic Fever

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content